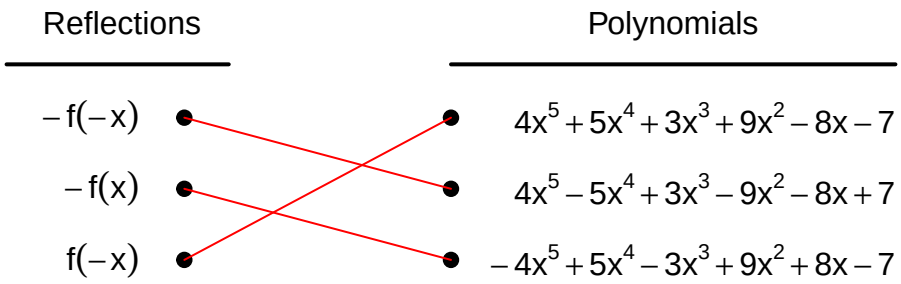
Name: Date:

Exam: Function Reflections (Solution version 50)

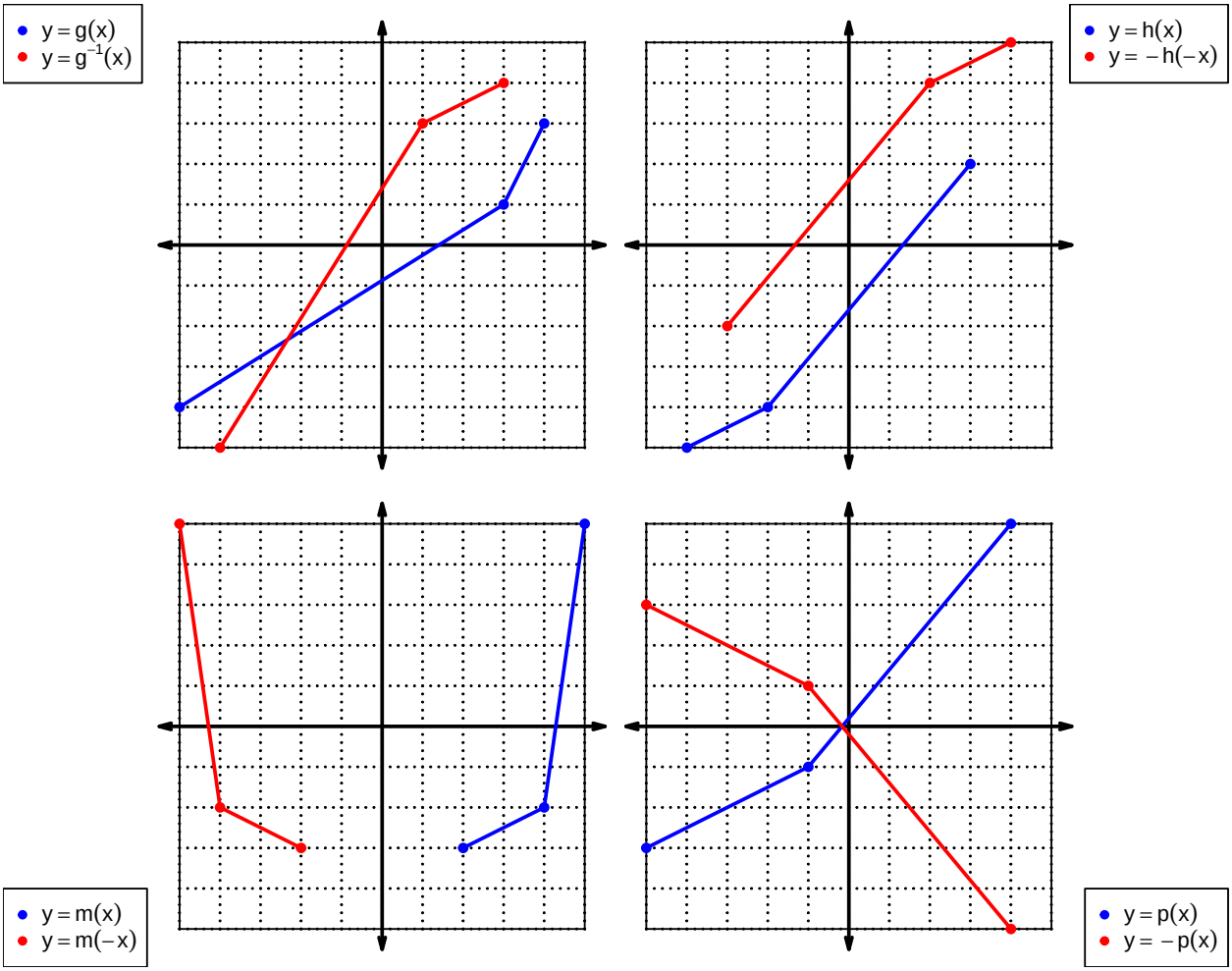
1. Let function f be defined by the polynomial below:

$$f(x) = -4x^5 - 5x^4 - 3x^3 - 9x^2 + 8x + 7$$

Draw lines that match each function reflection with its polynomial:



2. In each xy plane shown below, a function is graphed with blue. Draw the indicated reflections (as a second curve, indicated in legend) with black (or with whatever you have). The x axis is horizontal and the y axis is vertical (as typical), and the scale is equal on both axes.



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For all questions on this page, the functions f, g, and h are defined by the table below.

x	$f(x)$	$g(x)$	$h(x)$
1	7	7	4
2	8	3	8
3	5	6	1
4	9	8	2
5	4	9	3
6	2	5	7
7	3	4	5
8	6	1	9
9	1	2	6

3. Evaluate $g(4)$.

$$g(4) = 8$$

4. Evaluate $h^{-1}(1)$.

$$h^{-1}(1) = 3$$

5. By filling more rows of the table, it is possible to make function g **even**. If that were done, what would be the value of $g(-6)$?

If function g is even, then

$$g(-6) = 5$$

6. By filling more rows of the table, it is possible to make function f **odd**. If that were done, what would be the value of $f(-7)$?

If function f is odd, then

$$f(-7) = -3$$

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7. A function, f, is **even** if $f(x) = f(-x)$ for all x in the domain. A function, g, is **odd** if $g(x) = -g(-x)$ for all x in the domain.
   Let polynomial p be defined with the following equation:

$$p(x) = -x^2 + 1$$

   a. Express $p(-x)$ as a polynomial in standard form.

$$p(-x) = -(-x)^2 + 1$$
$$p(-x) = -x^2 + 1$$

   b. Express $-p(-x)$ as a polynomial in standard form.

$$-p(-x) = -\left(-x^2 + 1\right)$$
$$-p(-x) = x^2 - 1$$

   c. Is polynomial p even, odd, or neither?

   even

   d. Explain how you know the answer to part c.

   We see that $p(x) = p(-x)$ for all x because $p(x)$ and $p(-x)$ are equivalent polynomials. Thus function p satisfies the criterion for being an even function.

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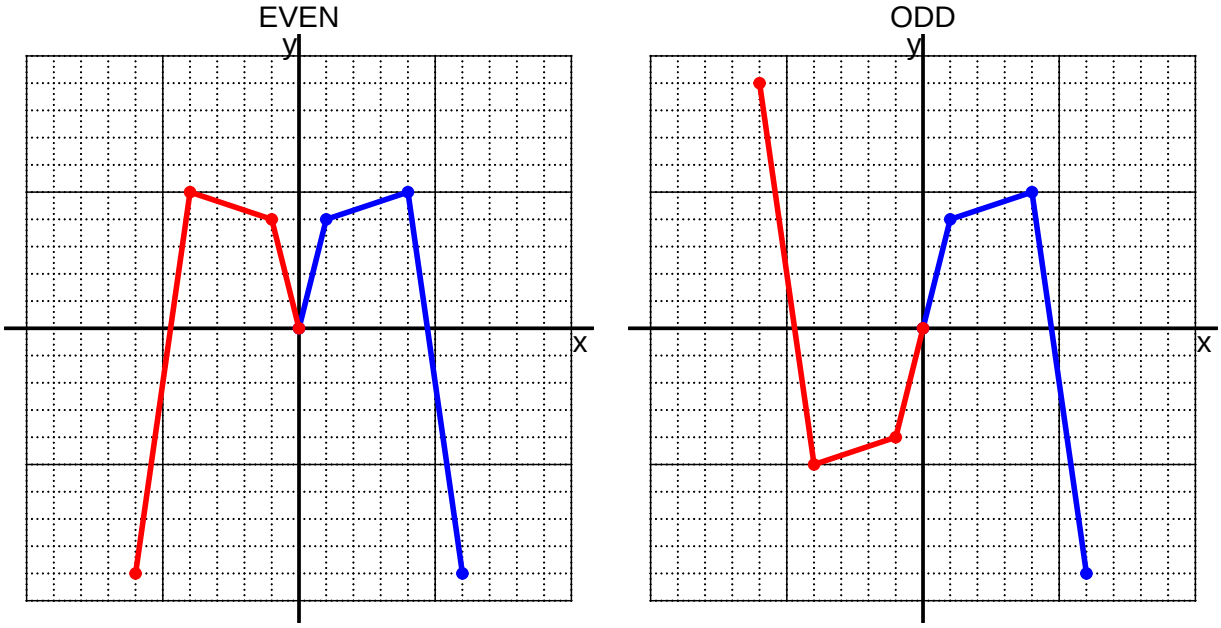
8. I have drawn half of a function. Draw the other half to make it even or odd.



9. Let function f be defined with the equation below.

$$f(x) = 8x - 6$$

a. Evaluate $f(5)$.

step 1: multiply by 8
step 2: subtract 6

$$f(5) = 8(5) - 6$$
$$f(5) = 34$$

b. Evaluate $f^{-1}(10)$.

step 1: add 6
step 2: divide by 8

$$f^{-1}(x) = \frac{x+6}{8}$$
$$f^{-1}(10) = \frac{(10)+6}{8}$$
$$f^{-1}(10) = 2$$

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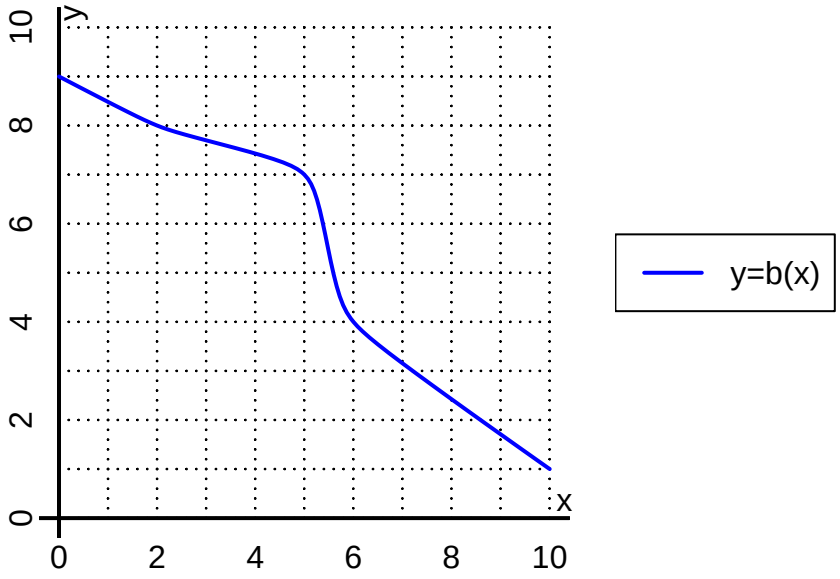
10. The function b is represented by the curve $y = b(x)$ graphed below.



a. Evaluate $b(5)$.

$b(5) = 7$

b. Evaluate $b^{-1}(4)$.

$b^{-1}(4) = 6$

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11. Function f is defined by the table below.

    a. Complete the columns for $-f(x)$ and $f(-x)$ and $-f(-x)$.

x	$f(x)$	$-f(x)$	$f(-x)$	$-f(-x)$
-2	8	-8	-8	8
-1	-9	9	9	-9
0	0	0	0	0
1	9	-9	-9	9
2	-8	8	8	-8

b. Is function f even, odd, or neither?

odd

c. How do you know the answer to part b?

Function f is odd because column $-f(-x)$ matches column $f(x)$ exactly.